Required Reporting of Negative Laboratory Results: ELR Data Handling Infrastructure

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Introduction/Purpose

There are compelling reasons to require reporting of negative laboratory results to improve surveillance:

- Acquisition of denominator data for trend analysis
- Determining end of infectivity
- Finalizing cases with negative confirmatory tests
- Identification of acute cases

However, requiring negative results increases the volume of messages and can overload the surveillance system and/or increase epidemiology staff workload unless processes are in place to handle the data automatically.

In October 2014, Utah approved a Communicable Disease rule requiring labs reporting via ELR to report negative results for all: * Chlamydia *Gonorrhea * Hepatitis A, B, and C * *HIV * Salmonella * STEC * Tuberculosis*

Methods

Utah uses EpiTrax (formerly known as TriSano) as the integrated surveillance system. Utah has developed an open source product known as EMSA (Electronic Messaging Staging Area) to receive and manage incoming electronic messages.

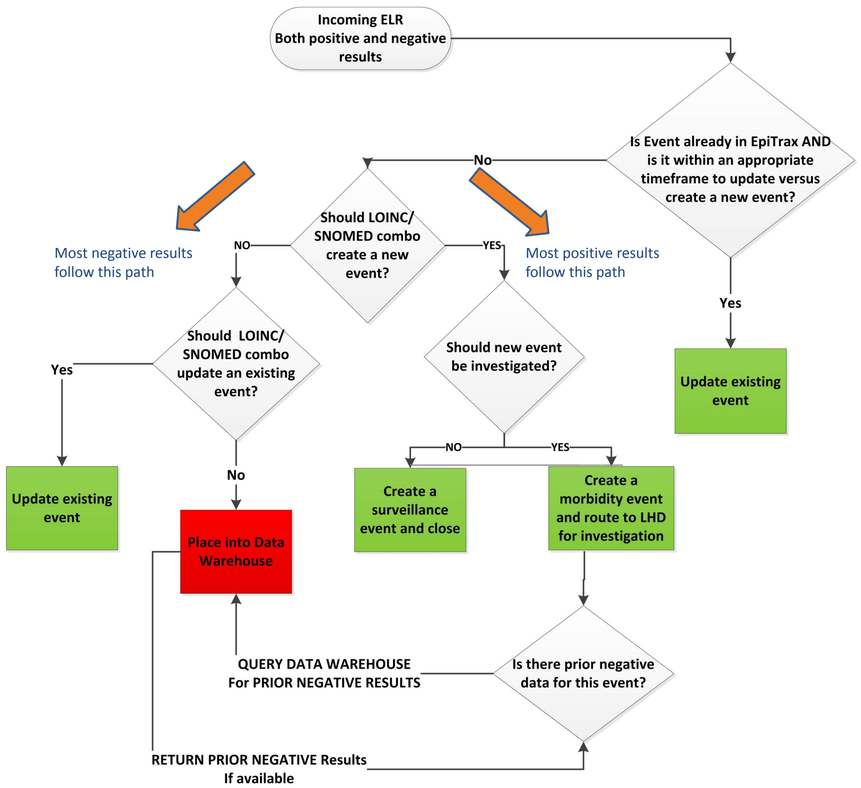
EMSA

- Can receive and parse all electronic messages via a master XML structure
- Has a robust LOINC and SNOMED code manager
- Has a front-end condition-based rules manager that permits epidemiologists to select whether an incoming message:
  - Is permitted into the database
    - Can initiate a new event
      - Can determine if the event is investigated
    - Can update an existing event
  - Is conditionally permitted into the database
  - Is not permitted into the database

EMSA was developed on enterprise-grade open source scalable tools such as the latest JEE platform, Mirth Integration engine, and PostgreSQL. Process speed is 1500-2000 messages per hour– the current system should be able to scale to meet any message load requirements.

Rules

The goal is to structure automated rules so that negative results not linked to current cases are diverted away from EpiTrax and into a secured data warehouse.

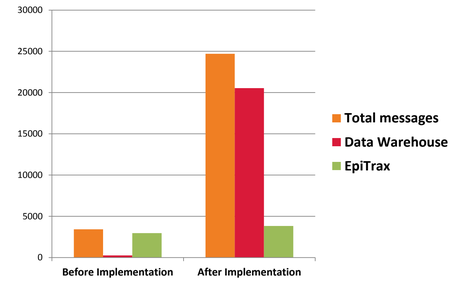


Security was paramount.

- Only data displayed above in EpiTrax can be viewed by State and Local epidemiologists.
- Epidemiologists do not have direct access to data in the secured **warehouse**; this data is purged after 18 months.
- Deidentified negative data is available to epidemiologists to use for denominator data.

Results/Conclusion

These graphs represent the ELR message volume from 2 high volume labs for a 1 month period, before and after implementation of the rule.



This chart shows the total messages received (620% increase), the number going into the secured data warehouse (7740% increase), and the number going into EpiTrax (29% increase).

This chart shows the impact by condition. The red and green columns represent the number of messages going into EpiTrax or into the secured data warehouse. The far right column represents the increase in message volume after implementation of the rule. (TB data is skewed due to the concomitant addition of Quantiferon results following implementation.)

	Before implementation		After implementation		
	EpiTrax	Warehouse	EpiTrax	Warehouse	% increase in message volume
Chlamydia	211	0	233	5157	2454
Gonorrhea	29	0	51	4715	16334
HCV	426	242	699	3880	585
HBV	130	86	205	4903	2264
HAV	0	0	0	860	*
HIV	937	743	985	815	7
TB**	13	0	41	829	6592
STEC	0	0	0	463	*
Salmonella	2	0	7	266	13550

Numbers represent a one month period for two reference labs.

There has been no noticeable impact on processing speed when increasing the number of messages. Current automated message volume is approximately 35,000 messages/month.

Workload for State and Local epidemiologists has not been increased.

Join us on Tuesday at 10:30 am in Room 102 for a session on how the negative data was used to detect new cases of HIV and on Wednesday at 7:30 am in the Clarendon Room at the Sheraton for a roundtable on the steps we took to amend the Communicable Disease Rule

Acknowledgements and Contacts

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